Cost-effectiveness of abdominal aortic aneurysm repair based on aneurysm size
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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

CRD summary
The objective was to evaluate the cost-effectiveness of early endovascular repair for small abdominal aortic aneurysms, compared with open or endovascular repair when they reached 5.5cm in diameter. The authors concluded that their analysis supported the usual care of observation for aneurysms of less than 5.5cm in diameter and that early endovascular repair was not likely to be cost-effective. There were a few limitations to the study, so the authors’ conclusions should be considered with caution.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to evaluate the cost-effectiveness of early endovascular repair for small abdominal aortic aneurysms compared with repair when they reached 5.5cm in diameter.

Interventions
Early endovascular repair for small aneurysms of 4.0cm to 5.4cm in diameter was compared with the usual care of elective open or endovascular repair for aneurysms of 5.5cm in diameter, in a hypothetical cohort of 68-year-old patients with an initial aneurysm diameter of 4.0cm.

Location/setting
USA/secondary care.

Methods
Analytical approach:
The data were synthesised using a Markov model, with a lifetime horizon. The authors stated that they took a payer perspective.

Effectiveness data:
The evidence was from selected published studies. The main parameters were the aneurysm growth, the rupture risk according to diameter, the effectiveness of the different strategies, and the short- and long-term side effects and acute mortality associated with the repair strategies.

Monetary benefit and utility valuations:
The utility estimates for the health states were from the literature.

Measure of benefit:
The measure of benefit was quality-adjusted life-years (QALYs), which were discounted at a rate of 3% per annum.

Cost data:
The cost categories were the interventions and the adverse events (myocardial infarction, dialysis, amputation, stroke, and infection), including follow-up. The costs were reported in 2007 US dollars ($). Most of the values were from Medicare charges and older costs were adjusted using the medical care component of the consumer price index. Future costs were discounted at 3% per annum.

Analysis of uncertainty:
The authors conducted a deterministic two-way sensitivity analysis varying the parameters of interest, while varying the aneurysm size from 4.0cm to 5.5cm. They also conducted probabilistic sensitivity analyses, using 1,000 random samples of all the parameters and their ranges and distributions were reported.

**Results**

Early repair of aneurysms at 5.0cm produced 7.11 QALYs compared with 7.16 QALYs for repair at 5.5cm (usual care). Early repair cost $30,900, while usual care cost $27,900. Early repair had 0.05 QALYs less than usual care and cost $3,000 more, making usual care dominant over early repair.

The same trend, less quality of life at a greater cost, was found for early endovascular repair of aneurysms as small as 4.0cm. The sensitivity analysis suggested that early repair of aneurysms ranging from 4.6 to 4.9cm could be cost-effective, if there was low long-term mortality after repair or if the quality of life was improved. It could also be cost-effective for aneurysms of 4.6cm or more if the baseline quality of life was poor.

The usual care of observation until the aneurysm was 5.5cm had a 79% probability of being cost-effective at a $50,000 willingness-to-pay threshold.

**Authors' conclusions**

The authors concluded that their cost-effectiveness analysis supported the usual care of observational management for abdominal aortic aneurysms of less than 5.5cm in diameter and that early endovascular repair was not likely to be cost-effective.

**CRD commentary**

*Interventions:*
Both interventions were adequately described. The analysis included the relevant comparators for the study setting, including the usual care of repair when the aneurysm reached 5.5cm in diameter.

*Effectiveness/benefits:*
The authors adequately described the sources of the effectiveness data and the inputs were clearly reported in a table, with their sources. They did not report the selection process for these sources nor the validation methods. This means it is unclear if a systematic review of the literature was undertaken and it is not possible to ascertain if all the best evidence was used. The details of the sources for the utility estimates were provided, but the methods used to estimate them were not, which makes it difficult to ascertain if appropriate estimates were used.

*Costs:*
The authors reported the sources and the adjustments made to the costs, but they did not report how and why they selected these sources.

*Analysis and results:*
The base-case results were only reported for aneurysms of 5.0cm and those of 5.5cm. A diagram of the model was given. The analysis of uncertainty was reasonable, but again limited results were reported. In the probabilistic sensitivity analysis, triangular distributions were used for the costs and utilities, but less simplistic methods could have been used.

*Concluding remarks:*
There were a few limitations to the study, so the authors’ conclusions should be considered with caution.

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**Bibliographic details**